

Recommendations:

1.) Applicable Test Code(s) - Conflicting Statements

- Per the Purchase Authorization and Expense Items Form Dated 01/14/02, the testing shall be done in accordance with ASME PTC 6.1 Alternative Procedure for Steam Turbines.
- Per the Memorandum Dated 02/05/02, Subject "HP Turbine Acceptance Testing, PR# 166260", the testing shall be done in accordance with ASME PTC 6 Test Procedure for Steam Turbines, 1996.
- Per the Test Procedure Section of "Turbine Cycle Performance Testing", ASME PTC 6 Steam Turbines Test Procedures utilizing the simplified procedure of the full scope test and utilizing the high pressure primary feedwater flow element.

Comment - All of these statements supply different levels of scope and requirements. Clarification to the specific test code to be utilized is necessary. The current accepted test code is ASME PTC 6-1996, "Performance Test Code 6 on Steam Turbines," which supplies guidelines for a full scale test and an Alternative Test for acceptance. However, older code versions such as ASME PTC 6S Report and ASME PTC 6.1 can be utilized if contractually agreed upon. It is suggested that IPSC perform a review of the contractual agreement and determine what test code is required for the acceptance testing. Specific reference to a particular test code will limit the scope. Supplying the contractual excerpts with the Purchase Requisition is also an option that would allow for vendors to understand the basis of the guarantees and how they are to be demonstrated per the contract.

2.) Scope of Work - Indistinct Description

- Per the Scope of Work Section of "Turbine Cycle Performance Testing" and the Memorandum Dated 02/05/02, Subject "HP Turbine Acceptance Testing, PR# 166260," the scope is as follows:

The objective of the HP turbine acceptance testing is to determine the HP turbine efficiency (enthalpy drop test) and HP Wheel Power (electrical load equivalent produced by the HP turbine). This information is required to determine HP turbine contract penalties and incentives.

In addition to testing the HP turbine for acceptance, the performance tests will also be used for benchmarking the performance of other key turbine cycle components. These include: the IP turbine (following its outage overhaul), retractable steam packing on HP & IP turbine, boiler feedpump volute acceptance (following outage changeout) and boiler feedpump turbines (detailed perf evaluation).

All station instrumentation points will be cross checked and reconciled with third party instrumentation. High accuracy instrumentation is critical to establish several key relationships; 1) HP Turbine Bowl Pressure (1st stage pressure tap replacement) to throttle steam flow for turbine controls setup, 2) final feedwater flow to throttle flow relationship (for controls as well as monitoring steam flow for safety valve limitations)

3) generator electrical output.

Comment - The scope of work for the HP turbine acceptance testing is clear in its intent, however the technical basis for determination of enthalpy drop and HP wheel power is not provided. Also, the scope pertaining to additional testing for "bench marking" purposes needs clarification. Some of the items in the scope do not pertain to a PTC 6 test. Is it intended that the data collected during the PTC 6 test be supplied for analysis of these items, is the vendor to provide analysis, what needs to be demonstrated for these devices, etc?

Comment - The scope of work does not specifically point out who is responsible to perform the station instrumentation reconciliation with third party instrumentation. Who will be responsible for the re-calibration and/or change out of instrumentation that is out of tolerance? Will plant operations be made available to record/compare plant readings? These points of scope need to be clarified.

Comment - The scope of work does not outline who is responsible for developing the test procedure(s), developing cycle isolation lists, reviewing station instrumentation, developing the pre/post test uncertainty analysis, performing the performance analysis, and developing the test report(s). Clarification to these items needs to be provided with a schedule for expected delivery.

3.) Summary High Accuracy Instrumentation Points - Redundancy Issue and Clarification

- Per ASME PTC 6-1996, duplicate instrumentation for critical data is required, such as flow nozzle pressure differentials and steam temperatures. Please refer to ASME PTC 6-1996 Fig. 4.11a-4.11e.
- Per the Electrical Power Measurement Section, three (3) Potential Transducers are required as temporary instrumentation.

Comment - It is suggested that duplicate instrumentation be requested for the Final Feed Water Nozzle Differential Pressure. This would change the number from one (1) in the supplied Request list to two (2). This suggestion should also be considered for other primary measurement locations.

Comment - The statement for Potential Transducers may be incorrect, was the intent to request temporary potential transformers?

Comment - It may be useful to supply calibration ranges or nominal operating values for the temporary instrumentation in the Purchase Requisition. This will aid the vendor in selecting the optimal devices for your needs.

4.) General - General Comments on Additions/Changes

Comment - The addition of a cycle heat balance(s) and P&ID(s) to demonstrate the nominal values, layout of the cycle, and measurement locations would be useful.

- Comment - The addition of a Vendor Supplied Instrumentation & Information review Scope Item with an Evaluation Report as a deliverable would be a beneficial addition. An evaluation of all the flow sections, measurement locations, station instrumentation needs to be performed prior to the test so that corrective measures can be taken during the outage.
- Comment - It is suggested that inspection (optical scoping) of the in-line flow nozzles be conducted prior to the testing. This should be added to the scope items.